STRUCTURAL PLATE PIPE AND PIPE-ARCHES FIELD SECTION 1023

1023.1 SCOPE. To establish procedures for the inspection, acceptance, and reporting of galvanized corrugated steel plates, and bolts and nuts intended for use in the construction of structural plate pipe and pipe-arches. The erection and inspection of the erected structure is a responsibility of Construction, if erected on the project.

1023.2 APPARATUS.

(a) Magnetic or electronic gauge, reading range 0-40 mils [0-1000 µm].

(b) Micrometer capable of measuring 0.0001 in. [0.00254 mm] and accurate to within at least 0.001 in. [0.0254 mm]

(c) Rule with suitable graduations to accurately measure the material to be inspected.

1023.3 PROCEDURE. Corrugated galvanized plates are to be accepted on the basis of the fabricator's certified analysis and guarantee, field testing for dimensions and corrugations and thickness of sheet, weight of coating, checking identification markings, and fabrication of the plates.

1023.3.1 Manufacturer's Certified Analysis and Guarantee. Prior to the acceptance of galvanized corrugated steel plates for structural plate pipe and pipe arches, the fabricator shall furnish the State Project Operations Engineer a Fabricator's Certificate and Guarantee as required by Specification Sec 1023. The acceptable fabricator's certified analysis and guarantee is only valid for base metal by the manufacturers shown in Field Section FS-1023 Table 1 of this Manual.

1023.3.1.1 Laboratory samples for determination of weight [mass] of coating and chemical analysis are to be taken at the option of the district Operations Engineer or when field inspection indicates questionable compliance. If samples are to be submitted to the Central Laboratory, they shall be taken at the frequency and of the size described in Specification Sec 1023.

1023.3.2 Field Inspection. Field testing for thickness of plate and measurement of the corrugations is to be performed on a minimum of one plate for each 100 plates, or fraction thereof, of each gage in a lot or shipment. A minimum of five thickness measurements shall be taken across the width of the sheet at one end. Two of these measurements shall be on the outermost full corrugations. Care shall be taken to avoid drip ends of plates. If any single measurement is found deficient more than the specified tolerance, that plate is to be rejected. Additional plates are to be measured until it is established the remainder of the plates are of satisfactory thickness or until it is evident that a substantial portion (approximately ten percent of the measured plates) of the lot is deficient, in which case the entire lot or shipment shall be rejected. Field measurement of corrugation depth and pitch is to be performed on the same plates as field thickness. Rejection and resampling for corrugation depth or pitch is the same as

for field thickness.

1023.3.2.1 Field determination of weight [mass] of coating shall be made by magnetic gauge on each lot or shipment of plates, whether samples are submitted to the Central Laboratory or not. One plate shall be selected for testing from each 100 plates or fraction thereof of each gage (thickness) in a shipment but in no case shall the number of plates tested be less than three. The magnetic gauge is to be operated and calibrated in accordance with ASTM E376.

1023.3.2.1.1 A single-spot test is to be comprised of at least five readings in a small area and those readings averaged to obtain a single-spot test result. Three such areas should be tested on each side of the plate being tested; one near each end and one near the middle. This would yield six single-spot test results for that plate. Test each plate selected in the same manner. Average all single-spot test results from all plates tested in that shipment to obtain the average coating weight [mass] to be reported. The minimum coating weight [mass] reported would be the lowest average coating found on any one plate. Since the specified coating weight [mass] is for double-exposed surfaces, the test results to be reported are to be doubled so the reported test results can be directly applied to the specifications.

1023.3.2.1.2 Material may be accepted or rejected for galvanized coating on the basis of magnetic gauge results. If a test result fails to comply with the requirements of the specifications, that lot should be resampled at double the original sampling rate. If any of the resample specimens fail to comply with the specifications, that lot is to be rejected. The fabricator is to be given the option of sampling for Central Laboratory testing, if the magnetic gauge test results are within minus 15 percent of the specified coating weight [mass].

1023.3.2.2 Inspection for fabrication is to include checking bolt hole size and spacing, repair of beveled ends, and workmanship. The details of workmanship are described in Specification Sec 1023.

1023.3.3 Identification Markings. Each plate is to be marked with a weather resistant marking placed on the plate by the fabricator so the identification marking will appear on the inside of the pipe or pipe-arch after erection. The marking shall show the name of plate fabricator, specified galvanized plate thickness, specified weight [mass] of coating, and identification symbols showing sheet manufacturer and heat or lot number.

1023.3.4 Bolts and Nuts. Bolts and nuts are to be accepted on the basis of a certified mill test report and field inspection. Samples need to be submitted to the Central Laboratory only when field inspection indicates questionable compliance.

1023.3.4.1 Bolts and nuts for use in structural plate pipe and pipe-arch are high-strength and require markings on the bolt heads and on the nuts. The required identification markings may be found in the applicable AS TM specification. The bolts and nuts are to be accompanied by a certified mill test report from the manufacturer, showing complete chemical and physical tests for the material and a statement that they were galvanized in accordance with AASHTO M 232, or were mechanically galvanized and meet the coating thickness, adherence, and quality requirements of AASHTO M 232, Class C.

1023.3.4.2 The bolts, nuts, and washers, when used, are to be tested for weight [mass] of coating with a magnetic gauge in the same manner as described in paragraph 1023.3.1.3 of this Section, except a smaller number of readings may be taken due to size and shape of the item. Samples selected for testing are to be taken at the frequency and of the size shown in the table below.

1023.3.4.3 Samples of the bolts, nuts, and washers may be submitted to the Central Laboratory for weight [mass] of coating, chemical analysis, dimensions, and physical testing if field inspection indicates questionable compliance. Tension tests may not be pos sible, depending on the length of bolt and shape of bolt shoulder, however, hardness can be determined. When samples are submitted to the Laboratory, a copy of the mill test report should accompany the sample. Samples for Laboratory testing are taken at the following rate:

Number of Pieces in a lot to be taken as a sample:

0-800	3
801-8,000	6
8,001-22,000	9
22,001 +	15

1023.4 SAMPLE RECORD.

1023.4.1 A sample record shall be completed in SiteManager, as described in Automation Section 3510, and shall be used to identify samples to be submitted to the Central Laboratory. The inspector is to show complete information in the sample record including the following for each lot or shipment sampled:

(a) Complete identification shown on the galvanized plate.

(b) Whether sample is cut from plate or is a coupon.

(c) Results of field thickness measurements (minimum or average) for each lot or shipment sampled.

(d) Whether corrugation dimensions comply with specification requirements.

1023.4.2 Inspection reports of the plates, nuts, bolts, and washers shall be made in SiteManager, and shall indicate acceptance or rejection. Appropriate remarks as described in General Sec 7 of this Manual, are to be included in the remarks to clarify conditions of acce ptance or rejection.

Completion of sample records for materials purchased under a Department purchase order is to be as described in Field Sec 2001 of this Manual.